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GENERAL NOTES

PUPAE OF *EURYTIDES THYASTES* AND OTHER LEPTOCIRCINE SWALLOWTAILS

Additional key words: Papilionidae, Leptocircini, Neotropics.

Immature stages of Neotropical kite swallowtails of the *thyastes* group (Rothschild & Jordan 1906, Novit. Zool. 13:726–734; Munroe 1961, Can. Entomol. Suppl. 17:17; Hancock 1983, Smithersia 2:20) are undescribed. In 1982 I obtained from Herbert Miers of Joinville, Santa Catarina, Brazil, four living pupae of the local member of the group, *Eurytides thyastes* (Drury), which he had reared. He told me that pupae of this species are sexually dimorphic in color, with green females and brown males, and indeed there were two of each sex and the colors were so distributed. It thus seems probable that pupal color in this species is not affected by the pupation environment, but, unlike the many examples of environmentally-cued pupal color dimorphism in swallowtails (Hazel & West 1979, Ecol. Entomol. 4:393–400 and others), green and brown pupae of *E. thyastes* are both dark and probably cryptic on the same substrates. The natural pupation sites are not known. *Eurytides thyastes* has a disjunct distribution: the upper Amazon region from NE Ecuador to Bolivia, and in SE Brazil near the coast (Rothschild & Jordan 1906, above). In Brazil the larval food is reported by Miers to be *Talauma ovata* A. St.-Hil. (Magnoliaceae), locally called 'baguaçú'. He reared the *E. thyastes* on leaves of this tree in October 1981. The species is univoltine in SE Brazil, and adults emerged in October 1982.

Fig. 1 shows a female pupa. Length 29.5 mm, widest point 9.5 mm, width of last abdominal segment 3.3. mm; thoracic horn about 2 mm long, projecting at 30° to the axis of the body. Green (female) and brown (male) pupae differ as follows: female green on all areas except where there is black (thoracic horn, dorsal surface of thorax, ventrally and dorsally on abdominal segments 4–6), pale tan (over wing bases, midventral region of abdominal segments 7 and 8, and in front of thoracic horn) or white (subdorsal mark on each side of abdominal segment 1). Ventral surface of last abdominal segment is brown, as are small tubercles on abdominal segments. Brown male pupae have exactly the same distribution of black, pale tan and white, but the green of the female is completely replaced by dull gray-brown. Among described leptocircine pupae it resembles *Eurytides epidaus* (Doubleday) (Ross 1964, J. Res. Lepid. 3:9–17), especially the head and the blunt thoracic horn, but *E. thyastes* is broader in the last few abdominal segments. The edges of the last segment are thick and dark. The pupa would merge with a thick branch if attached to one, much as *Papilio clytia* L. apparently does. Igarashi (1979, Papilionidae and their early stages, Tokyo [in Japanese] I:98) says that *P. clytia* pupates on branches at least as thick as a finger (translation), and it, too, has a broad tip on the abdomen (Igarashi 1979, above, II:color plate 107).

Both Munroe (1961, above) and Hancock (1983, above) place *E. epidaus* in the *marcellus* group, but its pupa differs in most respects from that of *E. marcellus* (Cramer). The thoracic horn of *E. marcellus* is pointed, and the pupa overall is smooth and patterned like the underside of a leaf, resembling those of some Old World *Graphium* spp. (Igarashi 1979, above). However, another member of the *marcellus* group, *E. marcellinus* (Doubleday), is, according to T. W. Turner (pers. comm.), "without any prominent projections".

In contrast, the *lysithous* group (*asius* of Hancock 1983, above) appears to be homogeneous in having bulbous green pupae with a long thoracic horn that continues the dark line on the side of the thorax and abdomen. Four members of the group are known to have this character: *E. belesis* (Bates) (Ross 1964, above, fig. 4A, B); *E. lysithous* (Hübner), *E. protodamas* (Godart) (West, unpubl. obs., specimens in Zoology Department, Universidade Federal do Paraná, Curitiba, Paraná, courtesy Prof. O. H. H. Mielke); *E. asius* (Fabricius) (H. Miers pers. comm.).

Apparently, pupae of the *protesilaus* group are undescribed, but that of one member of the remaining neotropical leptocircine group (*dolicaon* group) was described, though not figured, by D'Almeida (1924, Ann. Soc. Entomol. France 93:23–30): "Pupa 33 mm

FIG. 1. *Eurytides thyastes* female pupa. Left to right: dorsal, left lateral, ventral views.

long, 9 wide, conical, very elongate and slender towards the abdominal region, with a thoracic projection 7 mm long, triangular, horizontal, directed forwards and projecting over the cephalic region . . ." (D'Almeida 1924, above, D. A. West translation). Although sketchy, this description resembles something between *Graphium doson* (Felder) and *G. agamemnon* (L.) (Igarashi 1979, above, color plates 209, 213) and is quite different from *E. thyastes*.

In two related respects the pupae of *E. thyastes, E. marcellus* and *E. lysithous* are alike: the sculpturing of the posterior margin of the pupal hindwing has no "tail", and the developing adult tail within is folded back along the outer margin of the hindwing.

Pupal form may be a useful additional character for sorting out relationships in the Papilionidae. The limited data suggest that the *lysithous* group is monophyletic but that the *marcellus* group may not be. The comparison of Old and New World Leptocircini shows *Protographium, Lamproptera* and *Graphium* (Igarashi 1979, above), among the former, to be most similar to *E. marcellus* and perhaps *E. dolicaon*, among the latter. Hancock (1983, above) places the *thyastes* and *dolicaon* groups closest to the Old World genera and the *marcellus* group more distantly. Pupal morphology does not unequivocally support those placements, but the pupae of few species of Neotropical Leptocircini have been described.

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